

### **REMARKS**

These remarks are in response to the Final Office Action mailed January 12, 2011. The independent claims have been amended. Support can be found at page 25-26. No new matter is believed to have been introduced. The amendments distances recited in the claims were previously search in the two prior responses and therefore do not introduce matter requiring any further search. In fact, the Examiner has indicated at page 17 (8 lines from the bottom): "For this reason, the claims have been examined as though they were supported by the instant specification.. ." The claims are supported by the specification and as previously examined.

#### **I. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH**

Claims 98-110, 112-123 and 126-159 stand rejected under 35 U.S.C. §112, first paragraph as allegedly failing to comply with the written description requirement and lack of enablement. The claims allegedly contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants respectfully traverse this rejection.

First, Applicants believe there is still a misunderstanding with the Examiner regarding the invention. In the Non-Final Rejection mailed May 26, 2010, the Examiner characterizes the sensor film as comprising doped or undoped conductive organic material and conductive material. The Examiner has continued to cite references that teach layered materials or materials that do not comprise alternating regions of dissimilar material that are transverse to an electrical path.

Applicants' invention recite that the material comprises a conductive organic material (which is either doped or undoped) and a conductive material (e.g., a conductive inorganic material) that is compositionally different than the organic material. Although the graphic depiction provided in the Appeal depicts "ordered" alternating regions, this was solely meant to depict the alternating regions (see, e.g., Figure 1 of Appeal Brief filed November 5, 2004). The regions are not ordered but vary in distance from one another by 10-1,000 Angstroms (see, e.g., page 25, lines 20-24). In addition, the figure was used to in an attempt to depict the "path" being transverse to the alternating regions. To be transverse the Figure depicts the

'interpenetrating' aspect (i.e., the regions penetrate from the surface to the substrate). This alternating interpenetrating language is supported in the specification as previously described. With reference to the distance (i.e., 10-1,000 Angstroms), this language is also supported in the specification as set forth previously. It does not matter which of the material regions are referred to since they are interpenetrating and the distance between one material and the same material would be 10-1,000 Angstroms regardless of which material is being references.

The paragraph, cited in the Final Office Action at page 2, clearly contemplates the claimed language. For example, the paragraph reads, "The resistor comprises a plurality of **alternating regions of different compositions and therefore differing conductivity transverse to the electrical path**. . . For example....The gaps of different conductance arising from the organic conductive material range in path length from about 10 to 1,000 angstroms...." (emphasis ours). The paragraph describes that the materials alternate relative to path through the resistor between the leads. This requires that the material interpenetrate and that similar materials are separated by a distance. In other words, "alternating regions. . .transverse to the electrical path" requires interpenetrating alternating regions.

Previously Applicants recited "similar regions" separated by 10-1000 angstroms, this was searched by the Examiner. The current claims also encompass similar regions separated by 10-1000 angstroms.

For at least the foregoing reasons, Applicants respectfully request withdrawal of this rejection.

## **II. REJECTION UNDER 35 U.S.C. §102**

Claims 98, 104-105, 108-110, 112, 115, 117, 120-122, 126-127 and 159 stand rejected under §102(b) as allegedly anticipated by Haugen (Analytical Chemistry 1988). Applicants respectfully traverse this rejection.

In order for a claim to be anticipated the cited reference must teach each and every element of the claim. Haugen does not teach a sensor having regions of a conductive material and a conductive organic material having alternating regions separated by about 10-1000 angstroms between two conductive leads, wherein the conductive material is selected from the group consisting of an inorganic conductor,

a carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increase. Haugen does not teach gold as a sensing area. Haugen does not teach alternating regions including, for example, gold. Haugen teaches and suggests only a semiconductive material between two leads; there is no alternating regions. As indicated by the Examiner, Haugen teach "layers" (see, e.g., page 3, lines 12-20 of the Final Office Action): "In that section it is taught that very thin layers of semiconductor material exhibit substantial changes. . . when even a fractional monolayer. . . are deposited on them." Furthermore, Figure 5 of Haugen states that the gold microcrystal are "on a thin layer of phthalocyanine." This again demonstrates that lack of interpenetrating regions (i.e., a current could not be transverse to the alternating regions).

Thus, Haugen does not teach or suggest alternating regions transverse to the electrical path. In the absence of the alternating regions transverse to the electrical path (i.e., alternating interpenetrating regions) the chemiresistor would not function in the same manner as Applicants' claimed invention. Accordingly, Haugen cannot anticipate Applicants' claimed invention.

#### **IV. REJECTION UNDER 35 U.S.C. §103**

Claims 99, 101, 106-107, 113, 128-135, 137, 139 and 142-158 stand rejected under 35 U.S.C. §103 as allegedly unpatentable over Haugen (above) and further in view of Gibson or Lewis. Applicants respectfully traverse this rejection.

Haugen was addressed above and does not teach alternating regions separated by 10-1000 Angstroms of a conductive material and a conductive organic material. Lewis also does not teach or suggest alternating regions of a conductive organic material and a conductive material. Gibson also do not each or suggest alternating regions of a conductive material (wherein the conductive material is selected from the group consisting of an inorganic conductor, a carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the

temperature increase) and a conductive organic material. The Examiner points to the terms "copolymer" and "blends" as allegedly teaching alternating regions. However, as repeatedly pointed out in the prior responses and on appeal, a copolymers when polymerized do not form two separate materials but become a single material; blends of monomers for polymers. In addition, "blends" is highly indefinite and can only be considered as an alternative term for "copolymers". However, even if the term included combinations of two different types of conductive polymers the combination still would not provide alternative regions of a conductive organic polymer and a conductive material wherein the conductive material is not a polymer (as set forth in the claims and recognized by the Examiner at page 11, paragraph 10 of the prior office action). Furthermore, a "doped" polymer is not the same as alternating regions of a conductive material and a conductive organic material transverse to the electrical path.

The combination of Haugen and Gibson fails to teach or suggest alternating regions of a conductive material and a conductive organic material transverse to the electrical path.

The addition of Lewis fails to remedy the deficiencies of Haugen and Gibson. Lewis does not teach a sensor comprising a conductive material and a conductive organic material. Lewis teach sensor comprising insulating components.

For, at least, the foregoing reasons the claims submitted herewith are non-obvious over the references either alone or in combination.

Claims 100, 102-103, 113, 117-121, 123, 135 and 139-143 stand rejected as allegedly unpatentable over Haugen or Haugen in view of Gibson or Lewis as above and further in view of Stetter or Wampler. Applicants respectfully traverse this rejection.

Haugen and Haugen in view of Lewis or Gibson were addressed above. The addition of Wampler does not remedy the deficiencies above.

Wampler teaches that polypyrrole composites are useful for eliminating Cr(VI) in the environment by reducing Cr(VI) to Cr(III) (see, e.g., page 1820). Wampler does not teach or suggest sensors and sensor systems. There is absolutely no reason why one of skill in the art would even consider this reference in arriving at a

sensor material. The reference is directed to a purpose that has nothing to do with sensors, particularly resistometric sensors. There is no teaching or suggestion that any material in Wampler would be useful as a material in either an amperometric-electrochemical sensor system or in a conductimetric/resistometric sensor system. Applicants respectfully submit that the addition of Wampler, which has nothing to do with sensor systems, is based upon hindsight reconstruction, wherein the Office is picking and choosing among references that have no bearing on sensor systems to arrive at Applicants' invention. Such hindsight reconstruction and picking and choosing among references where there is no suggestion in the art for such combination cannot be done.

Furthermore, Wampler do not teach or suggest alternative regions of material wherein one comprises a doped conductive organic material and one is a conductive material is selected from the group consisting of an inorganic conductor, a carbon black, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increase. Again, this reference fails for at least the same reasons identified above with respect to Haugen, Lewis, and Gibson.

Stetter teaches the use of a chemiresistive layer comprising a mixture of conductive particles and an elastomer/polymer (see, column 3, lines 5-9). Various polymers are identified at column 4, lines 49-55, and consist of ethylene propylene, styrene butadiene, silicone, fluorsilicone, butyl rubber, isobutylene isoprene, chloroprene, fluorocarbon and polyacrylate, all commonly used insulating polymers. Thus, Stetter does not teach a mixture of two compositionally different *conductive* materials, but to the contrary teaches and suggests only mixtures of conductive material and non-conductive material. This is cumulative to Lewis (addressed above).

Claims 114, 116, 136, 138 and 158 stand rejected as allegedly unpatentable over Haugen or Haugen in view of Gibson or Lewis (as above) and further in view of Mifsud I and II (USP 5,801,297 and WO 95/08113, respectively). Applicants respectfully traverse this rejection.

Mifsud I and II are cumulative and teach that polymer sensors are less sensitive than semiconductive sensors (see, e.g., column 1, lines 62-64). In order to overcome this lack of sensitivity Mifsud I and II combine ***different sensor types*** (e.g., semiconductive sensors, polymer sensors, and surface-acoustic-wave sensors). Mifsud I and II teach combining sensor types ***not*** changing sensor materials. Mifsud I described the advantages of Mifsud's invention at column 3, lines 22-32:

The point of this . . . is to provide. . . three different means of detection in order to obtain better sensitivity and better general selectivity of detection. In fact, as has been explained at the beginning of the description, the different types of sensors, with semiconductive, conductive polymer or surface acoustic wave technology, each have different characteristics which are complementary: good sensitivity (semiconductive sensors), good selectivity (conductive-polymer sensors), and good mass/volume measurement (surface-acoustic-wave sensors). (emphasis ours)

Accordingly, the addition of Mifsud I and/or II does not remedy the deficiencies of the prior references.

Claims 98-99, 101, 104-110, 112-113, 115, 117, 120-122, 126-135, 137, 139 and 142-159 are allegedly unpatentable over Gibson (as described above) in view of Haugen (as above) and Barisci (Trends in Polymer Science, 1996). Applicants respectfully traverse.

As the Board recognized the differences in amperometric and resistometric sensors are significant in their operation. The fact that a polypyrrole amperometric sensor change chemically is due to "poisoning" which is a bad thing. One of skill in the art would not look to the "poisoning" of a material as a good thing in a resistometric sensor (i.e., "poisoning" is an undesirable aspect of both resistometric and amperometric sensors). Furthermore, the "oxidation" or "reduction" of an amperometric material is due to changes in the electrolyte solution (not due to the actual analyte being contacted with the sensor material). The oxidation/reduction of the electrolyte solution causes electron flow through an amperometric system (i.e., the electrons flow due to the oxidation/reduction. In contrast, resistometric sensor systems cause electron flow by a power source.

The fact that Barisci describes amperometric sensors and resistometric sensor general operations does not remedy the deficiencies of the prior references. In fact, the additional of Barisci appears to be derived by the Office performing hindsight reconstruction. For example, the hindsight reconstruction to combine the teachings at page 15, first full paragraph, makes little sense. There is absolute no suggestion in any of the references of a desirability to "reduce the resistivity of the organic conductor materials" or that such a "reduction" in resistance would facilitate a "more reasonable [detection] condition".

Even with the addition of Barisci the combination still fails to set forth a prima facie case of obviousness since the combination fails to teach or suggest the combination of the sensor materials as set forth in Applicants' independent claims including, but not limited to, alternating regions of different materials transverse to the electrical path.

Claims 100, 102-103, 113, 117-121, 123, 135 and 139-143 are allegedly unpatentable over Gibson in view of Haugen and Barisci as applied above, and further in view of Lewis, Stetter or Wampler. Applicants respectfully traverse this rejection.

Each of the references and various combinations thereof have been addressed above. Briefly, Gibson does not teach or suggest combination of a conductive material and an organic conductive material. Haugen and Gibson do not teach or suggest combination comprising regions of a conductive material and an organic conductive material transverse to the electrical path. Gibson, Haugen and Barisci do not teach or suggest combination of a conductive material and an organic conductive material. Gibson, Haugen, Barisci and Lewis, Stetter or Wampler do not teach or suggest combination comprising regions of a conductive material and an organic conductive material transverse to the electrical path. Layers of material would different materials would NOT function in the manner of Applicants' invention.

Claims 114, 116, 136, 138 and 158 are allegedly unpatentable over Gibson in view of Haugen and Barisci and further in view of Mifsud I and/or II. Applicants respectfully traverse this rejection.

Each of the references and various combinations thereof have been addressed above. Briefly, Gibson does not teach or suggest combination of a conductive material and an organic conductive material. Haugen and Gibson do not teach or suggest combination of a conductive material and an organic conductive material. Gibson, Haugen and Barisci do not teach or suggest combination of a conductive material and an organic conductive material. Gibson, Haugen, Barisci and Mifsud I and/or II do not teach or suggest combination of a conductive material and an organic conductive material.

For at least the foregoing, the Applicant submits that the claimed invention is patentable and request reconsideration and notice of such allowable subject matter.

The Director is authorized to charge any required fee or credit any overpayment to Deposit Account Number 50-4586, please reference the attorney docket number above.

The Examiner is invited to contact the undersigned at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted,

GAVRILOVICH, DODD & LINDSEY LLP

Date: July 12, 2011

By: /Joseph R. Baker, Jr./  
Joseph R. Baker, Jr.  
Registration No. 40900

4660 La Jolla Village Drive, Suite 750  
San Diego, California 92122  
(858) 458-3607 (Main)  
(858) 458-9986 (Fax)